

DESCRIPTION OF FEMALES OF *STETHOPHOTOPSIS* PITTS AND
SPHAEROPHTHALMA (*PHOTOPSIODES* SCHUSTER)
(HYMENOPTERA: MUTILLIDAE)

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Abstract.—The female of *Stethophotopsis maculata* Pitts, *Stethophotopsis cremauranti*, n. sp., and *Sphaerophthalma* (*Photopsioides*) *uro* (Blake) are described. These represent the first descriptions of the females of *Stethophotopsis* Pitts and *Photopsioides* Schuster.

Key Words: Insecta, Sphaerophthaminae, wasp, velvet ant, new species

Nocturnal mutillids of the southwestern United States have a high diversity, with about 206 known species. Anyone black lighting in the Southwest during the summer is awed by the number of male mutillids that are attracted to the lights. Females of these nocturnal species, however, are rarely collected. The females of many of the nocturnal southwestern Mutillidae species remain unknown. Only five species have been described from both male and female specimens. There are an additional 22 species that are known solely from the females. This leaves 176 species described from males. Some genera and subgenera, such as *Acanthophotopsis* Schuster, *Acrophotopsis* Schuster, and *Odontophotopsis* Viereck, lack a single female association and remain known only from the male. Female associations of these taxa would provide valuable data for generating a phylogenetic hypothesis of the sphaerophthalmine mutillids. This paper adds to our knowledge of the females of some of these nocturnal species.

A pair of *Stethophotopsis maculata* Pitts collected *in copula* was found among the undetermined mutillids in the University of Arizona Collection of Arthropods. The fe-

male represents the first female known for this genus. A second male was found doubling the known number of male specimens. It was noted that a congeneric species of female also existed. Examination of both species greatly helped in determining female characters of generic level importance. These two species are described, illustrated, and discussed below.

During a subsequent collecting trip near Portal, Arizona, a pair of mutillids was collected *in copula* at a black light. The male was identified as *Sphaerophthalma* (*Photopsioides*) *uro* (Blake). This paper provides the first description of a female of this subgenus. The female of *Photopsioides* Schuster is described, illustrated and discussed below.

MATERIALS AND METHODS

We follow Schuster's (1958) classification of the sphaerophthalmine genera. Currently, there is no phylogenetic hypothesis available for the subtribe Sphaerophthalmina. It is apparent that *Sphaerophthalma* is not monophyletic (pers. obs.), but reclassification of this group should not be done until more females are known. As the genus

now stands, the subgenus *Photopsis* Blake includes females that differ in characters that are considered to be of generic importance, such as a defined pygidium and a petiolate abdomen.

The following acronyms are used for collections that were involved in this study: Canadian National Collection of Insects, Ottawa, Canada (CNCI); Department of Entomology Collection, University of Arizona, Tucson (UAIC); James P. Pitts collection (JPPC).

After Ferguson (1967), we are adopting the following notation for punctuation in the order of decreasing coarseness: reticulate, coarse, moderate, small, fine and micropunctate. Micropunctate refers to punctures that are extremely shallow and do not have vertical walls or sharp margins. We have used the term simple pubescence for hairs that are smooth and do not have barbed surfaces. Brachyplumose pubescence refers to hairs with barbs that are less than or equal to the diameter of the shaft at the attachment of the barb. Plumose pubescence is used for hairs that have longer barbs. T2, T3, etc., are used to denote the second, third, etc., metasomal tergites while S2, S3, etc., denote the second, third, etc., metasomal sternites.

Stethophotopsis Pitts
(Figs. 1, 4, 7, 9, 10)

Type species.—*Stethophotopsis maculata* Pitts. Orig. desig.

Female.—*Head*: Narrower than thorax. Eyes projecting, subcircular, clearly faceted. Clypeus anterior edge truncate, base swollen medially. Dorsal carina of antenna present but inconspicuous or absent. Antennal tubercles well developed and subcontiguous. Antenna 12-segmented. Pedicel and first flagellomere subequal in length (Fig. 1). Mandible with internal tooth on distal one-third (Fig. 4). Ventral margin of mandible weakly emarginate at basal one-third (Fig. 4). Genal carina absent. Proboscis furrow triangular, broad, reaching base of mandibles and margined by carinae. Max-

illary palpus 6-segmented, labial palpus 4-segmented.

Mesosoma: Pyriform, slightly longer than wide (Fig. 7). Mesosoma gradually widening from humerus to anterior spiracular tubercles, widest at anterior spiracular tubercles, gradually narrowing from anterior spiracular tubercles posteriorly (Fig. 7). Scutellar scale absent (Fig. 7). Propodeum with separation between dorsal and lateral regions (Fig. 9). Lateral face of pronotum narrow, punctate, with anterior depression. Anterior half of mesopleuron glabrous. Metapleuron glabrous. Spurs of all tibiae pectinate.

Metasoma: First segment distinctly petiolate with respect to second (Fig. 10). T1 attached ventrally to midline of T2 in lateral view such that T2 bulges above attachment (Fig. 10). T2 with lateral felt lines (Fig. 10). S2 strongly convex and without lateral felt lines. T6 with pygidial area undefined. Plumose pubescence present on apical margin of T2. Coarsely punctate and raised integumental maculations present on T2.

Distribution.—Southern Arizona, USA; Sonora, Mexico.

Comments.—Females of *Stethophotopsis* can be distinguished from females of other sphaerophthalmine genera by the combination of presence of plumose pubescence on the metasoma, absence of dorsal carinae on the antennal scrobes, first antennal flagellomere as broad as long, absence of genal carinae, first metasomal segment petiolate, condition of the petiolar attachment, presence of coarsely punctate and raised integumental maculations on the second metasomal segment, and absence of lateral carinae defining pygidium.

Stethophotopsis is a distinct genus in the Sphaerophthalmini (subtribe: Sphaerophthalmina). For males, the unique sternal processes and the condition of the cuspis of the genitalia, being dilated, slightly spatulate, and elongated (attaining the length of the parameres), are apparently autapomorphic for the genus. It remains unclear at this point what characters, if any, are autapo-

morphic for females of this genus. *Stethophotopsis* males and females will key to subfamily Sphaerophthalminae without difficulty in existing keys by Brothers (1993, 1995). In Schuster's (1958) key to the sphaerophthalmine males of the North American Southwest, *Stethophotopsis* terminates at couplet I, where it can be distinguished by the autapomorphies listed above. Currently, there is no key for the sphaerophthalmine females.

Stethophotopsis maculata Pitts
(Figs. 1, 4, 7, 9, 10)

Female.—*Length*: 7.5 mm.

Head: Head brownish yellow, clothed with sparse erect and dense decumbent white simple pubescence. Malar space $0.6\times$ maximum eye width. First flagellomere $1.1\times$ length of pedicel (Fig. 1). Second flagellomere slightly longer than first, $1.4\times$ length of pedicel (Fig. 1). Scape and pedicel concolorous with head. Flagellum dark brown. Front with confluent punctation. Vertex narrowly reticulate. Mandible brown distally.

Mesosoma: Mesosoma and legs brownish yellow, except femora and tibiae dark brown. Pronotum and mesonotum with decumbent and short erect dark brown pubescence. Metanotum with decumbent white brachyplumose pubescence. Propodeum with white pubescence, somewhat darkened anteriorly, and with long erect and short plumose pubescence posteriorly. Legs with white brachyplumose pubescence. Humeri angulate. Lateral face of pronotum punctate with decumbent white pubescence. Mesopleuron with posterior half punctate with erect white pubescence; anterior half glabrous. Propodeum glabrous laterally; reticulate on lateral margins. Dorsum of mesosoma reticulated.

Metasoma: Yellowish brown. T1 with sparse long erect white brachyplumose and short plumose pubescence. T1 with apical fringe of white plumose pubescence. T2 with two round black integumental maculations on anterior fourth with deep punc-

tation, reticulate surface, raised above surrounding disk, with thick black simple pubescence. T2 felt line $0.2\times$ length of T2. T2–T5 with golden brachyplumose pubescence except black in areas of tergal maculations. T2 with golden-white plumose apical fringe. Sternites with white brachyplumose pubescence. S2 with median longitudinal tumid region on anterior fifth.

Material examined.—Mexico, Sonora, 5 mi east of Alamos, 1 ♀ 1 ♂, 11.VIII.1973, coll. K. Stephan and D. S. Chandler (UAIC); 1 ♂, Mexico, Sonora, 5 mi east of Alamos, 11.VIII.1973, coll. K. Stephan and D. S. Chandler (UAIC).

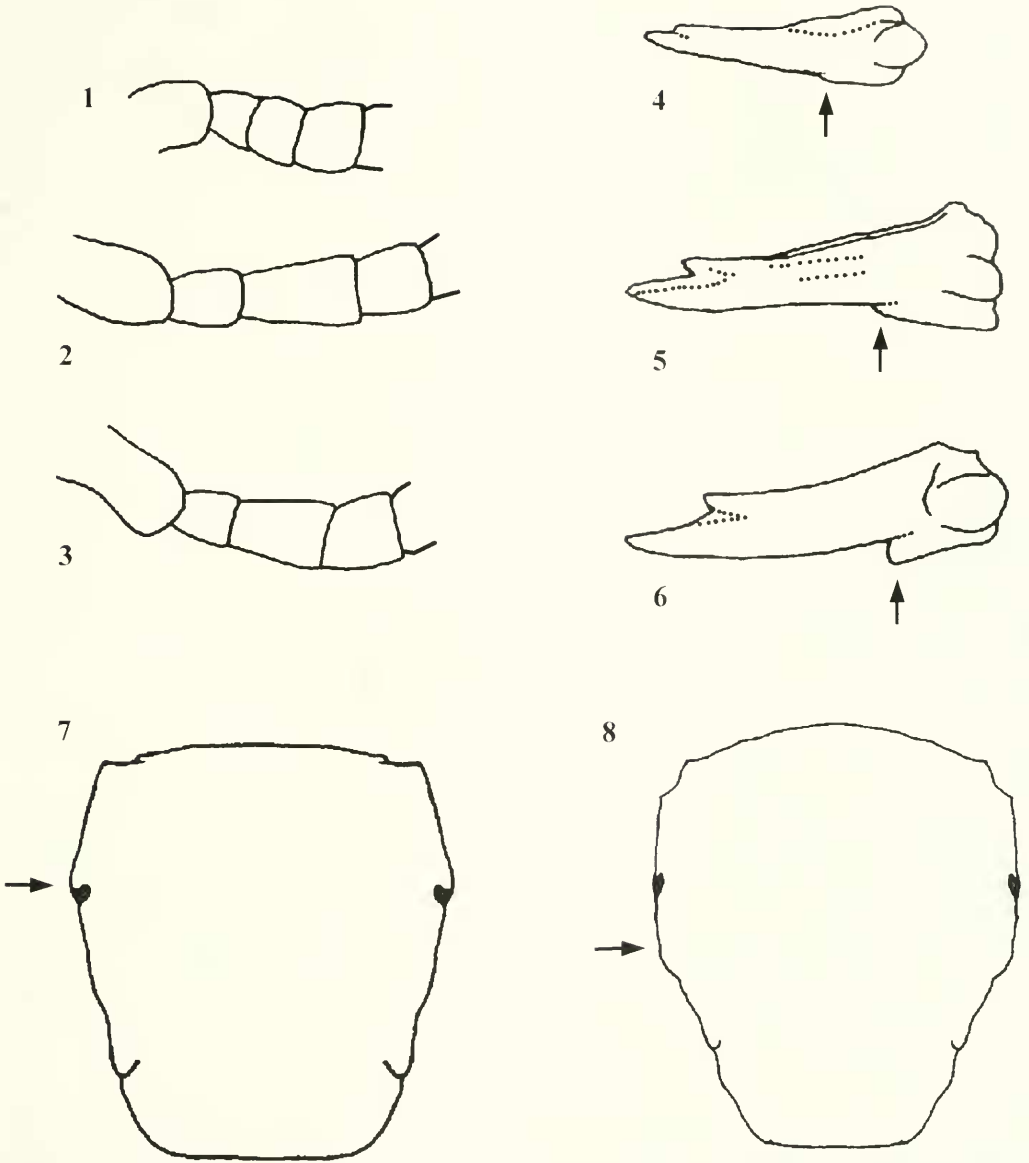
Comments.—One of the males and the female are mounted on the same pin and have an attached label stating that the pair was collected *in copula*. The two males differ from the holotype and paratype by being smaller (5 mm versus 7 mm) and having the integument around the ocelli darkened.

Stethophotopsis cremauranti Pitts and
Manley, new species

Female.—*Length*: 9 mm.

Head: Head orangish brown, clothed with sparse erect and decumbent pale golden brachyplumose pubescence. Malar space $0.7\times$ maximum eye width. First flagellomere $1.2\times$ length of pedicel. Second flagellomere slightly shorter than first, $1.1\times$ length of pedicel. Antenna dark brown. Antennal scrobe inconspicuously carinate dorsally. Front and vertex densely punctate. Mandible brown distally.

Mesosoma: Mesosoma, trochanters, and coxae orangish brown. Other segments of legs dark brown. Pubescence of pronotum, mesonotum, and propodeum anteriorly pale golden brown; erect pubescence simple; decumbent pubescence brachyplumose. Pubescence of propodeum anteriorly pale golden and posteriorly white. Pubescence of legs white. Lateral face of pronotum punctate with sparse erect pale golden pubescence. Mesopleuron posterior half punctate with erect pale golden pubescence. Propodeum with posterior lateral half punctate;



Figs. 1-8. 1-3. Apical end of scape and first three flagellomeres of female antenna. 4-6. Mandible of female, dorsal view; arrow indicate ventral emargination. Figs. 7-8. Thorax, dorsal view; arrow indicate widest point. 1, 4, 7. *Stethophotopsis maculata*. 2, 5, 8. *Sphaerophthalma (Photopsioides) uro*. 3, 6. *Sphaerophthalma (Sphaerophthalma) pennsylvanica*.

anterior half glabrous. Dorsum of mesosoma with coarse punctation.

Metasoma: Dark brown. T1 with long erect white brachyplumose and short plumose pubescence. T1 with apical fringe of white plumose pubescence. T2 felt line 0.3× length of T2. T2 with two round black

integumental maculations on anterior fourth with larger and deeper punctation, appearing slightly raised above surrounding disk. Maculations with decumbent and erect brachyplumose pubescence. T2-T5 with white brachyplumose pubescence except dark brown in areas of tergal maculations. T2-

T3 with sparse white plumose apical fringe. Sternites with white brachyplumose pubescence. S2–S3 with sparse white plumose pubescence on lateral apical margin, pubescence simple on median three fourths. S2 with median longitudinal tumid region on anterior fifth.

Material examined.—Holotype ♀, Mexico, Chihuahua, 3 mi east of Parral, 5800', 30.IV.1953, coll. Creighton (CNCL). Paratype, 1 ♀, Mexico, Chihuahua, 21 mi south of Parral, 5600', 30.IV.1953, coll. Creighton (CNCL).

Etymology.—From the Latin *cremo* meaning "to burn to ashes" and *auranti* meaning "orange" in reference to the color of the head and thorax.

Comments.—The paratype is only 7.5 mm in length, but the coloration and punctuation of both specimens are similar. *Stethophotopsis cremauranti* differs from *S. maculata* in being slightly larger in size. The coloration of the two species is very different. The head and mesosoma of *S. cremauranti* are slightly darker orange than the head and mesosoma of *S. maculata*. *Stethophotopsis cremauranti*, however, has the metasoma completely dark brown. The metasoma of *S. maculata* is dark brown only in the areas of the tergal maculations. Furthermore, *S. cremauranti* has an inconspicuous carina dorsally on the antennal scrobe, which is totally lacking in specimens of *S. maculata*. Also, the T2 maculations are well developed in *S. maculata* due not only to the fact that there are deep, raised punctures making the maculations appear raised above the surrounding area, but also because there is very thick, black, decumbent pubescence present. In specimens of *S. cremauranti*, neither deep, raised punctuation nor thickened pubescence is present.

Sphaerophalma (*Photopsioides* Schuster)
(Figs. 2, 5, 8, 11, 12)

Type species.—*Agama uro* Blake. Orig. desig.

Female.—*Head*: As wide as thorax. Eyes projecting, subcircular, clearly faceted.

Clypeus anterior edge truncate, base tuberculate medially. Antennal scrobes carinate dorsally. Antennal tubercles well developed and subcontiguous. Antenna 12-segmented. First flagellomere length 1.8× length of pedicel (Fig. 2). Mandible with strong internal tooth on distal one-third (Fig. 5). Ventral margin of mandible strongly emarginate at basal one-third (Fig. 5). Gena well developed, without genal carina. Proboscidal furrow triangular, broad, margined by carinae, becoming weak near base of mandibles. Maxillary palpus 6-segmented, labial palpus 4-segmented.

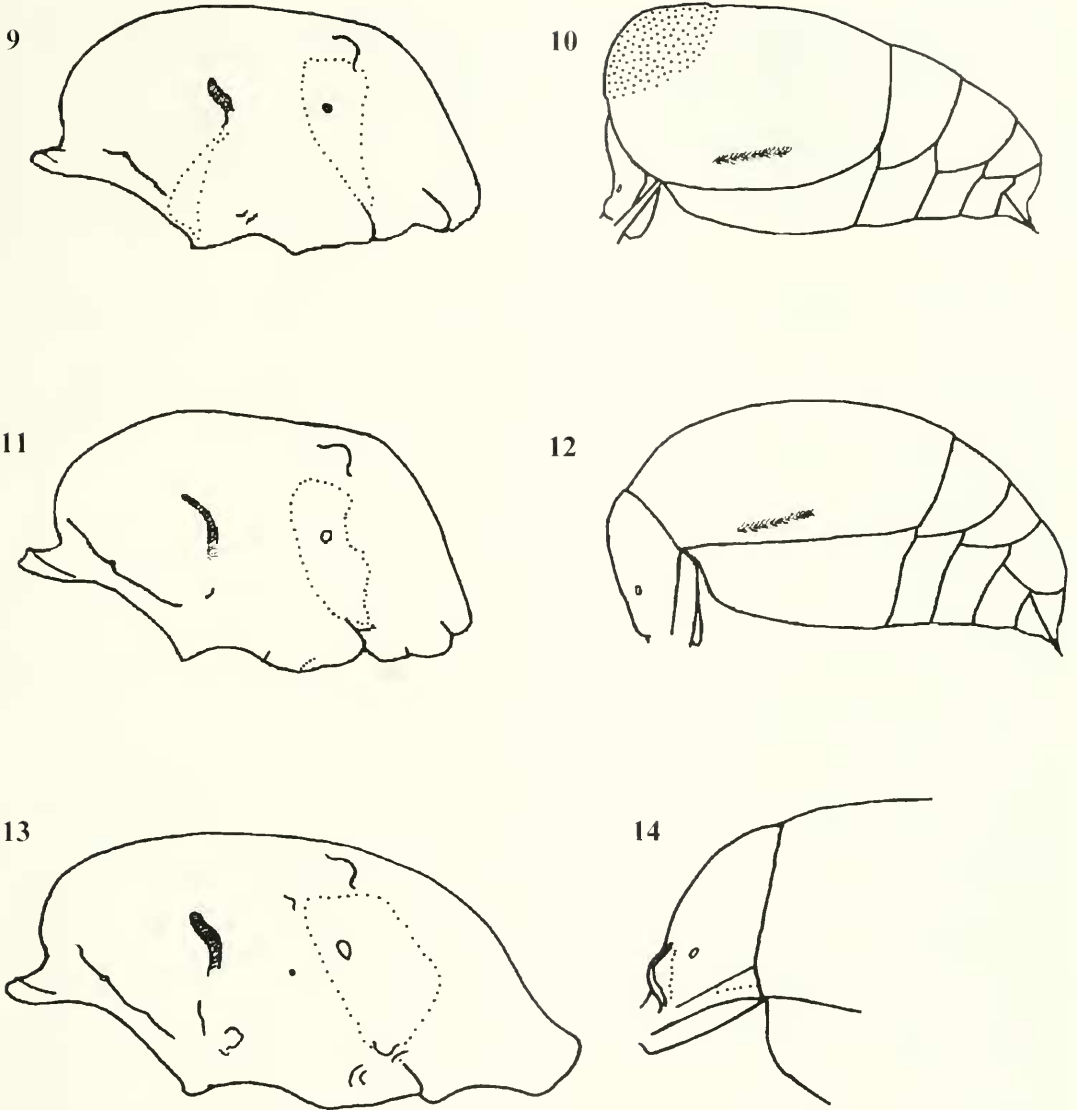
Mesosoma: Pyriform, slightly longer than wide (Fig. 8). Mesosoma widest anteriorly, gradually narrowing just posterior to anterior spiracular tubercles (Fig. 8). Scutellar scale absent (Fig. 8). Propodeum with distinct dorsal and lateral regions (Fig. 11). Lateral face of pronotum narrow and punctate. Mesopleuron punctate. Metapleuron glabrous. Metapleuron separated from mesopleuron by depression. Tibial spurs pectinate.

Metasoma: First segment subsessile with respect to second (Fig. 12). T2 with lateral felt lines (Fig. 12). S2 strongly convex, base prominently raised medially. S2 without lateral felt lines (Fig. 12). T6 with pygidial area undefined. Plumose pubescence present on apical margins of metasomal segments.

Distribution.—Southern Arizona, USA.

Comments.—Since only one species is known, it is difficult to diagnose the generic level characters. Some characters such as the presence or absence of a dorsal carina on the antennal scrobe may not be valid.

Photopsioides is similar to the subgenus *Sphaerophalma* by the following: presence of plumose pubescence, presence of dorsal carinae on antennal scrobes, first antennal flagellomere 1.8× as long as pedicel (Figs. 2, 3), and absence of lateral carinae that define the pygidium. The females of *Photopsioides* can be distinguished from *Sphaerophalma* by having a slight tooth on the ventral base of the mandible (Fig. 5) (not



Figs. 9–14. 9–10, *Stethophotopsis maculata*. 11–12, *Sphaerophthalma (Photopsioides) uro*. 13–14, *Sphaerophthalma (Sphaerophthalma) pensylvanica*. 9, 11, 13, Thorax, lateral, dotted line indicates impunctate area within. 10, 12, Metasoma, lateral. 14, First metasomal tergite and basal portion of second metasomal tergite, lateral.

strongly developed as in *Sphaerophthalma* s.s. (Fig. 6)), by the length of the propodeum in lateral view being subequal in length to $0.5\times$ the maximum height (Fig. 11) (not $\sim 1\times$ as in *Sphaerophthalma* s.s. (Fig. 13)), having a petiolar attachment that is more clearly petiolate (Fig. 12) than *Sphaerophthalma* s.s. (Fig. 14), and having sparse plumose pubescence on the apical margins of metasomal segments (not having

only a median band of dense appressed plumose pubescence on the apical margin of metasomal segment one (for *Sphaerophthalma pensylvanica* (Lepeletier)) or segments one and two and a median propodeal stripe (for *Sphaerophthalma auripilis* (Blake)).

Males of *Photopsioides* are similar to those of the subgenus *Sphaerophthalma*. Both have the pygidium and hypopygium short and truncated, lack sternal felt lines,

and the cuspis of the genitalia is dilated and covered with plumose tipped setae (Schuster 1958). Males of *Photopsioides* differ from those of the subgenus *Sphaerophthalma* by being nocturnal, weakly sculptured, and having sparse pubescence on the ventral margin of the parameres (Schuster 1958).

Sphaerophthalma (Photopsioides) uro
(Blake)
(Figs. 2, 5, 8, 11, 12)

Female.—Length: 9–10 mm.

Head: Head orangish brown, clothed with sparse erect pale white brachyplumose pubescence. Malar space $0.6\times$ maximum eye width. First flagellomere $1.8\times$ length of pedicel (Fig. 2). Second flagellomere length equal to length of pedicel (Fig. 2). Antenna orangish brown. Front and vertex with small dense punctures. Mandible reddish black apically.

Mesosoma: Mesosoma orangish brown. Legs slightly darker than mesosoma. Pubescence of pronotum, mesonotum and metanotum pale golden brown. Propodeum with white brachyplumose pubescence, plumose posteriorly. Humeri angulate. Lateral face of pronotum punctate with sparse erect pale white pubescence. Mesopleuron punctate with erect pale white pubescence. Metapleuron glabrous. Propodeum punctate laterally. Dorsum of mesosoma coarsely punctate. Propodeum surface narrowly reticulate posteriorly.

Metasoma: Orangish brown. T3–T6 slightly darker than T1 and T2. T1 with erect brachyplumose pubescence and shorter erect white plumose pubescence. T1 with apical fringe of white plumose pubescence. T2 felt line $0.3\times$ length of T2. T2 with brown erect subplumose pubescence, white on apical margin. T3–T5 with white pubescence. T2–T4 and S2–S5 with dense white plumose apical fringe. S2–S5 with simple white pubescence. T2 surface reticulate anteriorly, coarsely punctate posteriorly. T3–T6 finely punctate. S1 coarsely punctate with white plumose pubescence. S2 with

median longitudinal tumid region on anterior fifth, coarsely punctate. S3–S6 finely punctate.

Material examined.—Arizona, Cochise Co., 3 mi north of Portal, 1 ♂ 1 ♀, 3.VIII.1999, coll. J.P. Pitts (JPPC); Cochise Co., 2 mi north of Portal, San Simon Road, 1 ♀, 1.VIII.2000, coll. J.P. Pitts (JPPC); Cochise Co., Portal, 1 ♀, 23.VI.1969, Coll. V. D. Roth (UAIC); Pima County, 8 mi north of Vail, 1 ♀, 30.VIII.1962, coll. F. Werner (UAIC).

Comments.—The specimens differ in size slightly. One specimen is darker beneath the felt lines.

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